AMENDMENTS TO THE DRAWINGS

The attached sheet(s) of drawings include no changes to the figures, but include images with improved resolution for reproduction.

Attachments: Replacement sheet 1/2 containing Figures 1A and 1B, and replacement sheet 2/2 containing Figures 1C and 1D.

REMARKS

Reconsideration of this application is respectfully requested. Claims 19 and 20 have been canceled without prejudice or disclaimer. Claim 2 has been amended. Claims 21-24 have been added and are directed toward the elected species and pharmaceutical compositions thereof. No new matter has been added by this amendment. Claims 1, 2, 5, 6, 10, 11, 14, 15 and 21-24 are pending and currently at issue.

Amendments and Objections to the Specification

The specification has been amended to include the continuity data of this application. No new matter has been added by this amendment. In view of the above amendment, the Examiner is respectfully requested to remove the objection to the specification based on a lack of continuity information.

The specification has been amended to more accurately describe the use of white instead of color in the confocal microscopy images in Drawing Figures 1A - 1D. In addition, replacement sheets for Drawing Figures 1A - 1D are included as an attachment to this amendment. No changes were made to the drawings, however, the resolution quality of the replacement figures is improved. No new matter has been added by these amendments. In view of the above amendments, the Examiner is respectfully requested to remove the objection to the specification for reference to colors and the objection to the drawings.

The specification has also been amended to include a table (Table 4) listing the percent identity between the peptide represented by SEQ ID No. 1 and the peptides represented by SEQ ID NOS. 2 to 34. No new matter has been added by the addition of Table 4. As provided by M.P.E.P. § 2163.07(a), "[b]y disclosing in a patent application a device that inherently performs a function or has a property, operates according to a theory or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it."

The M.P.E.P. § 2163.07(a) further provides "[t]he application may later be amended to recite the function, theory or advantage without introducing prohibited new matter." The percent identity between two amino acid sequences is an inherent relationship between the two sequences, and is determined merely by mathematical manipulation. The percent identity between the peptide represented by SEQ ID No. 1 and the peptides represented by SEQ ID NOS. 2 to 34 was calculated by:

1) determining the number of amino acid positions that the two sequences have in common, this was done for each of SEQ ID NOS. 2 to 34, as compared with SEQ ID No. 1,

2) dividing the number of identical amino acid positions by the total number of amino acids in SEQ ID No. 1, and

3) multiplying by 100.

Both the number of identical amino acids, and the percent identity, for each possible pair are shown in Table 4. This mathematical calculation is well within the skill of one in the art, therefore Table 4, and the data contained therein, are not new matter.

Amendment and Objections to the Claims

Claim 2 is objected to for the recitation of "SEQ ID NOS: 1-34." Claims 6, 11 and 15 are objected to as being dependent thereof.

Claim 2 has been amended to include peptides with at least a 23.8 % sequence identity with the peptide of claim 1. Support for this amendment can be found in original claim 2, Table 1 on page 11 of the specification, and Table 4, which is added by amendment to the specification in this response. The peptides of SEQ ID NOS: 1-34, are recited as a group in original claim 2, and they have the amino acid sequences shown in Table 1 of the specification. As shown by Table 4, each sequence has at least a 23.8 % sequence identity with the peptide of SEQ ID NO: 1. The percent identity between two peptides is an inherent property of the relationship between two peptides, therefore no new matter has been added by this amendment.

Amended claim 2 no longer recites SEQ ID NOS: 2-34. In view of the above amendments, the Examiner is respectfully requested to remove the objection to claim 2, and the rejection of claims 6, 11 and 15, which depend from it.

Rejections Under 35 U.S.C. § 102(b)

Claims 1, 2, 5, 6, 10, 11, 14 and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,936,063 to Kim et al. ("the '063 patent"). The '063 patent discloses a *bufo bufo gargarizans* antimicrobial peptide having the following amino acid sequence:

A-G-R-G-K-Q-G-G-K-V-R-A-K-A-K-T-R-S-S-R-A-G-L-Q-F-P-V-G-R-V-H-R-L-L-R-K-G-N-Y.

It is respectfully presented that *bufo bufo gargarizans* peptide disclosed by the '063 patent does not anticipate the peptide called for by claim 1 sequence equation (I). There is only one proline in the *bufo bufo gargarizans* peptide, and this amino acid is required by X^6 of sequence equation (I). Therefore, positioning this proline with X^6 of sequence equation (I) leads to the following alignment (where the *bufo bufo gargarizans* peptide of the '063 patent is above, and sequence equation (I) of the present invention and as set forth in pending claim 1 is below):

A	G	R	G	K	Q	G	G	K	V	R	A	K	A	K	T	R	S	S	R	A	G	L	Q	F	P	V	G	R	V	H	R	L	L	R	K	G	N	Y
																			X^1	X^2		X^3	X^4	X^5	X^6	X^7	X^8	X^9	X^{10}		X^{11}		X^{12}		X^{13}		X^{14}		

Position X^3 of sequence equation (I) from claim 1 calls for a basic amino acid. As can be seen in the above sequence alignment, the amino acid of the '063 peptide corresponding to X^3 is a leucine. Leucine is a hydrophobic amino acid, not a basic amino acid (See page 7, lines 1-4 of the specification).

Position X^{11} of sequence equation (I) from claim 1 calls for two identical or different basic amino acids. As can be seen in the above sequence alignment, the amino acids of the '063 peptide corresponding to X^{11} are an arginine and a leucine. Arginine is a basic amino acid, but

leucine is a hydrophobic amino acid, not a basic amino acid (See page 7, lines 1-4 of the specification).

Position X^{12} of sequence equation (I) from claim 1 calls for two identical or different hydrophobic amino acids. As can be seen in the above sequence alignment, the amino acids of the '063 peptide corresponding to X^{12} are a leucine and an arginine. Leucine is a hydrophobic amino acid, but arginine is a basic amino acid, not a hydrophobic amino acid (See page 6, lines 24-25 to page 7, line 1 of the specification).

Position X^{13} of sequence equation (I) from claim 1 calls for two identical or different basic amino acids. As can be seen in the above sequence alignment, the amino acids of the '063 peptide corresponding to X^{13} are a lysine and a glycine. Lysine is a basic amino acid, but leucine is not a basic amino acid (See page 7, lines 1-4 of the specification).

Position X^{14} of sequence equation (I) from claim 1 calls for two identical or different hydrophobic amino acids. As can be seen in the above sequence alignment, the amino acids of the '063 peptide corresponding to X^{14} are an asparagine and a tyrosine. Asparagine is not a hydrophobic amino acid (See page 6, lines 24-25 to page 7, line 1 of the specification).

The *bufo bufo gargarizans* peptide disclosed by the '063 patent does not anticipate claim 1 of the present invention for at least the reason that the amino acids corresponding to X^3, X^{11}, X^{12}, X^{13} and X^{14} of sequence equation (I) do not fall within the corresponding properties called for in claim 1 for the corresponding amino acids. Claims 2, 5, 6, 10, 11, 14 and 15 depend from claim 1 and therefore are also not anticipated by the *bufo bufo gargarizans* peptide. The Examiner is therefore respectfully requested to withdraw the rejection of claims 1, 2, 5, 6, 10, 11, 14 and 15 for anticipation by the '063 patent.

Claims 1, 2, 5, 6, 10, 11, 14 and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by Biological and Biophysical Research Communications, Vol. 244, pages 253-257, 1998 to Park et al. ("the Park BBRC paper"). The Park BBRC paper discloses a buforin I and buforin II antimicrobial peptide (See Table 1 on page 8246). The buforin I peptide is the peptide

described in the '063 patent, discussed above. The buforin II (BUF II) peptide is a fragment of the buforin I peptide and can be aligned with sequence equation (I) of claim 1 by positioning its sole proline with X^6 of sequence equation (I) as described above. This alignment is shown below:

BUF II	T	R	S	S	R	A	G	L	Q	F	P	V	G	R	V	H	R	L	L	R	K	
					X^1	X^2		X^3	X^4	X^5	X^6	X^7	X^8	X^9	X^{10}		X^{11}		X^{12}		X^{13}	

The buforin II peptide does not anticipate claim 1 of the present invention for at least the reason that its amino acid positions corresponding to X^3, X^{11} and X^{12} do not fall within the scope of sequence equation (I) called for in claim 1 for the same reasons discussed above for buforin I (the '063 peptide). Claims 2, 5, 6, 10, 11, 14 and 15 depend from claim 1 and therefore are also not anticipated by the buforin II peptide. The Examiner is therefore respectfully requested to withdraw the rejection of claims 1, 2, 5, 6, 10, 11, 14 and 15 for anticipation by the Park BBRC paper.

Claims 1, 2, 5, 6, 10, 11, 14 and 15 are rejected under 35 U.S.C. § 102(b) as being anticipated by PNAS, USA, Vol. 97, No. 15, pages 8245-8250, July 19, 2000 to Park et al. ("the Park PNAS paper"). The Park PNAS paper discloses the buforin II antimicrobial peptide, discussed above, and several analogs (See Table 1 on page 8246).

The sequences disclosed in Table 1 of the Park PNAS paper do not anticipate claim 1 of the present invention for the following reasons. The four "Amino acid substitutions" peptides disclosed in Table 1: $[L^7]$BUF(5-21), $[K^2][K^6][L^7]$BUF(5-21), $[RVHRLLR]_3$ and $[RLLR]_5$, do not contain a proline, and therefore cannot be aligned with sequence equation (I) of claim 1. Therefore, these peptides do not have an amino acid sequence that falls within the scope claim 1 of the present invention.

The eleven "Truncation" peptides disclosed in Table 1 are fragments of buforin II (BUF II) and contain at least one of X^3, X^{11} and X^{12}, which as described above, do not fall within the scope of claim 1. Therefore, the truncation peptides do not anticipate claim 1 of the present invention for the same reasons discussed above for buforin II. These peptides, along with buforin II, are shown in the table below:

BUF II	T	R	S	S	R	A	G	L	Q	F	P	V	G	R	V	H	R	L	L	R	K	
BUF(5-21)					R	A	G	L	Q	F	P	V	G	R	V	H	R	L	L	R	K	
BUF(6-21)						A	G	L	Q	F	P	V	G	R	V	H	R	L	L	R	K	
BUF(7-21)							G	L	Q	F	P	V	G	R	V	H	R	L	L	R	K	
BUF(8-21)								L	Q	F	P	V	G	R	V	H	R	L	L	R	K	
BUF(9-21)									Q	F	P	V	G	R	V	H	R	L	L	R	K	
BUF(10-21)										F	P	V	G	R	V	H	R	L	L	R	K	
BUF(11-21)											P	V	G	R	V	H	R	L	L	R	K	
BUF(1-17)	T	R	S	S	R	A	G	L	Q	F	P	V	G	R	V	H	R					
BUF(5-20)					R	A	G	L	Q	F	P	V	G	R	V	H	R	L	L	R		
BUF(5-19)					R	A	G	L	Q	F	P	V	G	R	V	H	R	L	L			
BUF(5-18)					R	A	G	L	Q	F	P	V	G	R	V	H	R	L				
					X^1	X^2		X^3	X^4	X^5	X^6	X^7	X^8	X^9	X^{10}		X^{11}		X^{12}		X^{13}	

The two "Hybridizations" peptides disclosed in Table 1 of the Park PNAS paper each contain a single proline, and therefore are aligned against sequence equation (I) of the present invention as shown below:

BUF(5-13)$[RLLR]_3$	R	A	G	L	Q	F	P	V	G	R	L	L	R	R	L	L	R	R	L	L	R		
BUF(5-13)MG(1-14)	R	A	G	L	Q	F	P	V	G	G	I	G	K	F	L	H	S	A	K	K	F	G	K
	X^1	X^2		X^3	X^4	X^5	X^6	X^7	X^8	X^9	X^{10}		X^{11}		X^{12}		X^{13}		X^{14}		X^{15}		

The peptide BUF(5-13)$[RLLR]_3$ does not anticipate claim 1 of the present invention for at least the reason that it does not contain a basic amino acid at the position corresponding to X^3. Position X^3 of sequence equation (I) in claim 1 calls for a basic amino acid. As can be seen in the above sequence alignment, the amino acid of the '063 peptide corresponding to X^3 is a leucine. Leucine is <u>not</u> a basic amino acid (See page 7, lines 1-4 of the specification).

BUF(5-13)MG(1-14) does not anticipate claim 1 of the present invention for at least the reason that it does not contain a basic amino acid at the position corresponding to X^3, which as discussed above must be a basic amino acid, and leucine is a hydrophobic amino acid. In addition, this peptide does not contain the required amino acids in the positions corresponding to X^9, which

requires a basic amino acid. Glycine is not a basic amino acid (See page 7, lines 1-4 of the specification). This peptide also does not contain the required amino acids in the positions corresponding to X^{10}, which requires two hydrophobic amino acids. Glycine is not a hydrophobic amino acid (See page 6, lines 24-25 to page 7, line 1 of the specification). Nor does this peptide does not contain the required amino acids in the positions corresponding to X^{11}, which requires two basic amino acids. Phenylalanine is not a basic amino acid (See page 7, lines 1-4 of the specification). The positions corresponding to X^{13}-X^{15} also do not contain the amino acids called for by sequence equation (I) of claim 1.

For the foregoing reasons, the peptides disclosed by the Park PNAS paper do not anticipate claim 1 of the present invention. Claims 2, 5, 6, 10, 11, 14 and 15 depend from claim 1 and are therefore also not anticipated by the Park PNAS peptides. The Examiner is therefore respectfully requested to withdraw the rejection of claims 1, 2, 5, 6, 10, 11, 14 and 15 for anticipation by the Park PNAS paper.

In view of the preceding comments and amendments, the pending claims are believed to be in condition for allowance and such action is earnestly solicited.

Dated: August 10, 2007

Respectfully submitted,

By _____
S. Peter Ludwig
Registration No.: 25,351
DARBY & DARBY P.C.
P.O. Box 770
Church Street Station
New York, New York 10008-0770
(212) 527-7700
(212) 527-7701 (Fax)
Attorneys/Agents For Applicant

Attachments

Attachment A

In connection with Application No. 10/509,366

(Replacement Sheets for Figures 1A, 1B, 1C, 1D)